

2. *Habrothamnus tomentosus*, Bth. Pl. Hartw. n. 369.
3. *Habrothamnus corymbosus*, Endl. Bot. Mag. tab. 4201; Van Houtte, Flor. ii. tab. 10. *Meyenia corymbosa*, Schl. loc. cit. 252.
4. *Habrothamnus cyaneus*, Lindl. Bot. Reg. n. s. Misc. 72.
5. *Habrothamnus paniculatus*, Mart. & Gal., Bull. Acad. Brux. xii. 148.
6. *Habrothamnus roseus*, Mexico. *Cestrum roseum*, H. B. K. iii. 59. tab. 197.

XVI.—On the effects produced by some Insects, &c. upon Plants.
By JAMES HARDY, Penmanshiel*.

I do not intend in the present notices to offer any remarks on the general subject of the effects of the Annulosa upon vegetation; this is a theme too important to be disposed of cursorily, and to follow it out in detail would require a treatise. I design merely to make a few statements relative to some observations recently made on some points, where botany and entomology may be said to be conterminous and capable of affording mutual illustration.

1. *Vibrio Graminis*.

On the 28th of May I noticed that the leaves of the sheep's fescue grass (*Festuca ovina*), and if I recollect aright, of some other grasses, growing close upon the sea-coast, were affected with several purplish swellings, of which I brought away examples for examination. They only appear a little thicker than the leaf in whose substance they originate, and according to their length are squarish or oblong, slightly roughish, stiff and rounded like a piece of wire, and occupy either the entire breadth or are confined to the edges. At first, from finding in the interior only bluish or purplish granules, I felt disposed to attribute them to a fungus; till opening others more carefully, I observed several minute Annelides, coiled up in channels winding amongst the granules. These I subsequently found were *Vibriones*, of which one species, *Vibrio Tritici*, as is now well understood, produces the disease called "Ear Cockles," or "Burnt Corn" in wheat. Others of somewhat similar character swarm in decaying potatoes and turnips, and the "eel" of vinegar is an example familiar to microscopic amateurs. Some of the knots contained only a single occupant, but one of the more elongated ones had about half a dozen of various sizes. The worms are white, almost transparent, very minute and slender, just visible to the eye,

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pointed at each end, the posterior tapered for a very considerable space, contracting as it were by three separate gradations till it terminates in a point; the head end is something like that of an eel, bluntish, and gradually widening out for a considerable way backwards, where there is a greenish annulus, formed perhaps by the commencement of the intestines, as behind this there is a cloudiness all along the middle. I could not perceive the oral opening, but behind the point there is a dusky spot connected by a line with the interior. The young ones are immaculate white, but the old contain a profusion of greenish granules, which may be either the eggs or the undigested food. Although not indicated externally, the body is evidently composed of a series of rings which separate the internal contents; as one in which the skin happened to be ruptured was emptied in a manner corresponding to this structure. The movement of the particles at the wound was a rapid rush, which extended itself by degrees upwards; but there were intervals where the current seemed to be impeded as if by constrictions, upon passing which it again flowed freely. The worms placed in moisture agitate themselves to and fro, but are usually rather inactive. The length is about 1 line. The species is probably new, and may be called *Vibrio Graminis*.

According to the observations of Mr. Bauer, *Vibrio Tritici* is originally introduced, in the young or egg state, into the germinating seed-corn, and after a succession of generations during the passage, is conducted by the propulsion of the circulating fluid up higher and higher, till it reaches the ear. Whether this be the means by which the present species gains access to the position which it occupies, I cannot determine. It is by no means uncommon, and as the parts affected by its presence dwarf the blade, interfere with the healthy flow of the sap, and will probably soon decay, it may be regarded as somewhat prejudicial to the coast pastures, which are principally composed of the grasses that it attacks. The granules with which the knots are filled give out a brown tincture when moistened.

2. *Cecidomyiæ* of the Willow, Rose, and Rock-rose.

It has recently been discovered by the German naturalists, that several of the galls which the Cynipides originate upon the leaves of trees produce two different forms of gall-fly; it has not however, so far as I am aware, been remarked, that the galls formed by the Dipterous *Cecidomyiæ* may in like manner be colonized at one and the same time by distinct species. The rose-gall upon the summits of willow shoots has attracted the attention of most observers, and DeGeer has briefly indicated the fly (*Cecidomyia salicina*), which he reared from the red larva which occasions it, as

black with brown wings. During the present spring I met with one of these productions upon the *Salix cinerea*, tenanted by about eight or nine pupæ, which became flies on the 22nd of May, and these were at once seen to be not all of one species. The smallest and most numerous had the wings dusky and very pubescent, with the antennæ 17-jointed in the male and 16-jointed in the female, and were from $\frac{3}{4}$ -1 line long, and the expanse of the wings 2 lines. The second, of which I only obtained a single male, was considerably larger, had the antennæ 22-jointed, the wings ample, clear, with only a few scattered hairs. Length $1\frac{1}{2}$ line, expanse of the wings 4 lines. I have not been able to identify these with any described species, and have named the first *C. saligna*, and the second *C. Cinerearum**. The *Cecidomyia salicina* of DeGeer, according to Macquart's account, has about twenty joints in the antennæ, and has the wings hairy and slightly obscure. Length 2 lines. The woody oblong gall of the willow likewise produces a *Cecidomyia*, which I venture to term *C. Gallarum-Salicis*. If I mistake not, from an examination of dried specimens, the antennæ are 20-jointed in the male and 19-jointed in the female, and the wings are slightly dusky and grayish pubescent. The length is $1\frac{1}{2}$ line, and the wings are 3 lines in expanse. Bouché, on the other hand, describes from this gall an insect which he likewise designates *Cecidomyia Salicina*, as 1 line long, with brown wings. There is thus a great confusion of synonyms on this topic, and it is possible from the observations which I have just recorded, that this may have arisen from insects really distinct having passed under the review of different observers. Mr. Westwood has recently brought forward another species found in the young twigs of *Salix viminalis* and *S. rubra*. This he names *C. viminalis*, and in it the antennæ are 17-jointed in both sexes, and the wings are colourless with the hinder margin strongly fringed.

I have also recently remarked an instance of two species of gall-midges acting in concert on roses. The leaflets of various wild species of these are tenanted in the centre by companies of larvæ which cause this part to thicken and blister on each side of the midrib, and the leaflet being thereby prevented from expanding, protects, as if in a pod, the little community. These larvæ have the characters of those of the *Cecidomyiæ*, viz. are spindle-shaped or subelliptical, only slightly convex, with distinct subcompressed lateral margins, the head end attenuated to a point, with a pair of horn-like bristles behind it, a dusky spot visible above and beneath, and a dagger-shaped polished mark

* *Cinereæ*, a sectional term applied by Mr. Borrer to the sallows.

on the fore-part of the breast; and the hinder end is subtruncate, slightly tuberculate. The most numerous is orange mottled with yellow; and the other is white, smoother, more minute, with the hinder apex trituberculate: both are sparingly bristled across the segments. The first is scarcely distinct from another yellowish grub often found on the underside of the leaves of garden roses affected with mildew, which appears to be engaged in devouring the minute fungi in which the disease consists. They descend into the soil to undergo their changes, and I doubt if I shall succeed in rearing them. About the time of their first appearance, however, I met with two species of *Cecidomyia* frequenting the infested rose-bushes, of which one, *C. Rosarum*, was occupied in depositing its eggs in the unopened leaflets. They are both undescribed species, and till the contrary is proved, I shall assume that they are the parents of the grubs in question.

To render these remarks more satisfactory, I shall append descriptions of the species to which they refer; which, except in the instance previously specified, are taken from fresh specimens.

1. *C. saligna*; nigro-cinerea; facie, verticeque sericeo-albis; occipite, oculisque nigris; scutello, lateribus, margineque posteriori thoracis subcarneis; pleuris et macula ante bases alarum argenteis; abdomine carneo, segmentis superne transversim nigricante fasciatis (♀); vel nigricante, marginibus posticis segmentorum vix carneis (♂); pedibus subelongatis, argenteo-cinereo-testaceis, tarsis fuscis; alis modice amplis, denigratis, dense griseo pubescentibus et fimbriatis, nervo costali nigro, angulo nervi furcati subrecto; antennis brevibus, cinereis, basi substestaceis, 16-articulatis, articulis duobus primis cyathiformibus, ultimoque ovato exceptis, suboblongis, confertis, pilis verticillatis obsitis (♀); vel nigris, 17-articulatis, articulis, 1mo cyathiformi, 2ndo subrotundato, ultimoque subgloboso exceptis, pedicellato-oblongis, pilis longis fere biverticillatis obsitis (♂); halteribus albis, modice elongatis et clavatis. Long. corp. lin. $\frac{3}{4}$ -1; alar. exp. lin. 2.
2. *C. Cinerearum*; nigro-cinerea; facie grisea; oculis nigris; thoracis lateribus, nonnisi pleuris, maculaque ante bases alarum argenteis, concoloribus; dorso subelevato; abdominis dorso nitido piceo, lateribus obscurioribus; pedibus praelongis, pallide testaceis vel carneis, argenteo-micantibus; alis amplis, subhyalinis, sparse cinereo-pubescentibus et fimbriatis, nervis brunneis, subtenuibus, angulo nervi furcati subrecto; antennis nigris, 22-articulatis, articulis duobus primis crassioribus, subtransversis, reliquis, ultimo elongato-ovato excepto, pedicellato-subglobatis, introrsum longe, extrorsum breviter discreteque pilis verticillatis obsitis; halteribus elongatis albis, capitulo subdilato vix fuscescente. Long. corp. lin. $1\frac{1}{2}$; alar. exp. lin. 4. ♂.
3. *C. Gallarum-Salicis*; nigro-cinerea; scutello piceo, concoloreve; , *Ann. & Mag. N. Hist.* Ser. 2. Vol. vi. 13

pleuris, ventre, lateribusque abdominis argenteis; pedibus elongatis cinereis, argenteo-micantibus; alis subamplis, subdenigratis, dense cinereo-fimbriatis, nervo costali crasso, obscuro, angulo nervi furcati rectiore; antennis nigris, 19?-articulatis, articulis confertis, dense setigeris, duobus primis, ultimoque exceptis, subcylindricis (♀); vel 20?-articulatis, duobus primis, ultimoque elongato oblongo-ovato exceptis, pedicellato-oblongo-subquadratis, confertim pilis verticillatis obsitis (♂); halteribus albis, capitulo dilatato. Corp. long. lin. $1\frac{1}{2}$; alar. exp. lin. 3.

4. *C. Rosarum*; nigricans, minuta, nitida, vix subcinereo micans; thoracis margine posteriori, alarum radicibus, scutelli apice, metathoraceque interdum carneis; abdomine carneo, segmentis ad bases nigricantibus; ventre notis nigris asperso; pedibus elongatis gracilibus, albo-argenteis, subcinereisque variantibus; alis mediocribus abdomine brevioribus, denigratis, crebriter atro-cinereo pubescentibus et fimbriatis, nervo costali, primoque longitudinali, subnigris, angulo nervi furcati subrecto; antennis brevibus, gracilibus, nigris, 14-articulatis, articulis subcrebre pilis longis verticillatis obsitis, 1mo cyathiformi, 2do rotundato, 3io ovato breviter pedicellato, succedentibus oblongo-ovatis, confertis, ultimo tamen breviter ovato; halteribus albis, modice elongatis et clavatis. Long. corp. lin. 1; alar. exp. lin. 2. ♀.
5. *C. rhodophila*; pallida, minuta, gracilis; capite atro; thoracis dorso fusco-cinereo, lineis tribus pilorum griseorum notato, margine posteriori, scutello, metathoraceque flavidis, subcarneisve; abdomine curtato pallide flavo; pedibus elongatis, gracilibus, subflavis, extrorsum cinerascensibus; alis sublatis, hyalinis, purpureo-iridescentibus, subtiliter minus confertim pubescentibus et fimbriatis, nervo costali, primoque longitudinali distinctis, subdenigratis, angulo nervi furcati subacuto; antennis nigris, basi flavidis, gracilibus, 18-articulatis, articulis, 1mo et 2do brevioribus, crassioribusque, subcyathiformibus, succedentibus cylindricis, gradatim longitudine et latitudine decrescentibus, ultimo ovato, breviter discreteque pilis verticillatis obsitis; halteribus albis. Long. corp. lin. $\frac{1}{2}$; alar. exp. lin. $1\frac{1}{2}$. ♀.

Obs. *Mas* adhuc exilior evasit.

About the 2nd of July the leaves at the summits of the twigs of *Helianthemum vulgare*, in this vicinity, were collected into bunches, but not so firmly compacted as those of the shallow. At the bases of the leaves numbers of the larvæ of a *Cecidomyia* were congregated, to whose operation the deficient extension of the shoots was owing. The grubs were narrow, slightly orange, with the centre more dusky, somewhat truncate, and quadrilateral behind; the attenuated anterior end with a pair of bristle-like horns and a dusky spot; a testaceous dagger-like line on the breast, and a few hairs on the segments, with five or six apical ones. Length 1 line. From these I reared a single specimen of the midge, which may be named

6. *C. Helianthemi*; ochracea, minuta; oculis brunneis; thorace subflavo, atomis strigisque fuscis variegato; scutello carneo; facie, pedibus, antennisque flavis, his 14-articulatis, articulis, 1mo et 2ndo brevibus, ultimo subelongato, ceteris angustiore, reliquis pedicellato-subcylindricis, capitulis subcylindricis versus bases subcoarctatis, pilis longis biverticillatis obsitis; alis mediocribus, subalbido-flavidis, pallide nervosis, subcinereo-maculato-fasciatis, exitibus fasciarum maculas 7 cinereas marginales efficientibus, angulo nervi furcati subacuto; halteribus albis, capitulo modico. Long. corp. lin. $\frac{3}{4}$; alar. exp. lin. $1\frac{1}{2}$. ♂.

Obs. Habitu *C. bicoloris*, sed abunde differt; a *C. punctipenni*, Meig., numero articulorum antennarum minore, facile dignoscitur.

3. Spotting of the leaves of Grasses, &c.

I have often been unable to account for the suddenness with which the leaves of *Ranunculus repens*, and of many grasses (*Triticum repens* and *Alopecurus pratensis* being of the number) growing by the sides of walls, become whitened in minute specks and irregular lines all over the upper surface, as if the colour had been extracted from them, or had left some cells by a kind of elective preference for others. I have recently found this to be occasioned by a small dusky red-legged mite, which harbours under stones, but comes out in the sunshine in immense swarms to feast upon the foliage. Owing to the numerous mouths at work, large patches, especially in the grasses, are speedily drained of their sap and become quite dead or blighted. The mite is not described in any accessible work on the Arachnides. Dr. Johnston considers it to be a *Rhyncholophus*, but that the structure of the fore-legs indicates an affinity with *Bryobia*. From *Trombidium* it differs, he observes, in the eyes being sessile and on the shoulders. I have named it *R. haustor*, and the following specific character may serve to distinguish it:—

R. subovatus, atro-sanguineus, fronte, vitta dorsali, marginibus elevatis corporis plerumque, pedibusque coccineis; oculis, serieque marginali granulorum rufis; pedibus anticis gracilibus extensis posterioribus duplo longioribus. Long. corp. vix lin. $\frac{1}{4}$.

It occurs likewise upon the leaves of fruit-trees, but the dusky parts are then greener. In autumn it is much darker and more convex. It runs rapidly, agitates its fore-legs like antennæ, sloughs off its skin where it feeds, and leaves behind it an excrementitious deposit that glitters like honey-dew.

4. *Adelges Abietis*.

This insect forms the cone-like excrescences on the spruce-fir. The original matriarch lives outside the gall, remaining all winter in a dormant state at the root of the bud. As soon as the bud

swells she revives likewise, and speedily becoming enlarged with the juice imbibed, she lays some hundreds of eggs about her. The bud meanwhile instead of growing in length becomes fleshy, and this fleshiness is communicated to the leaves. The result is an arrested bud, into the recesses of which, the young issuing from the cluster of ova on the outside of it beneath betake themselves, and become soon closed in during the growth consequent on the increased irritation occasioned by their presence in its interior.

From the statement of Linnæus one might infer that he was acquainted with the process of their formation: "Corpus Abietis in ipsis ramorum extremitatibus fragiforme, habet extus supra se et inter squamas foliaceas imbricatas, in sinu squamarum, plurima animalcula parva, e quorum ano quasi lana prominet. Juxta basin hujus corpusculi seu fragi observatur lana major in copia, in qua mater minorum, quæ caussat fragum."—*Faun. Succ.* p. 215. no. 700. edit. 1.

As to the alleged diversity of the species produced by the small rounded cones at the summit of twigs (*Chermes coccineus*, Ratz.), and those from the larger, more fleshy, and more oblong galls arising at the bases, or enveloped in the substance of shoots (*C. viridis*, Ratz.), the greater exposure to the sun is sufficient to give a deeper tint of colour as well as a more rapid evolution to the inclosed inmates. The difference assigned in the structure of the wing-veins quite eludes my detection.

Those arrested individuals that pass the winter on the branches are perhaps the progeny of winged females, which are oviparous. I observe, also, that winged females of two other species are in like manner oviparous, viz. those of *A. Laricis* and *A. corticalis*. M. Macquart had long since remarked this fact in regard to *A. Laricis*, and felt persuaded that it was only the second generation whose winged females are in this condition. He considered it to be a *Psylla*, and being anomalous proposed to form of it a new genus, which, not finding he had prefixed a name to, MM. Amyot and Serville, in attempting to supply the oversight, have called *Cnaphalodes* (Hemipt. 594, 595). The structure however of the larvæ of *Adelges*, as well as that of the mature insect, indicates that it follows the type of the *Coccidæ* rather than either that of the *Psyllidæ* or *Aphidæ*.

XVII.—*Remarks on some British species of Carex.*

By W. O. PRIESTLEY, F.B.S.E.*

HAVING been engaged studying the British Carices for some time past, and having made some observations which may be

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